

IN THE CLAIMS

This listing of the claims will replace all prior versions, and listing, of claims in the application or previous response to office action:

1. (Currently Amended) An electrochemical corrosion sensor that provides multiple channels of output voltage signals, comprising:

an array of substantially similarly structured metallic electrodes arranged such that each electrode has a surface area operable to be exposed to an electrolyte at the site of the corrosion and such that each electrode is electrically insulated from other electrodes, wherein a plurality of the electrodes are operable as anodes and a plurality of the electrodes are operable as cathodes;

and

a common electrical lead connecting each electrode through a resistor to a common node, such that a voltage output signal from each electrode may be measured across a resistor associated with the electrode;

wherein the common node couples the terminals of the electrodes through the resistors to simulate a one-piece metal electrode in electrochemical behavior.

2. (Original) The sensor of Claim 1, wherein the electrodes are each made from the same material.

3. (Original) The sensor of Claim 1, wherein each resistor has substantially the same resistance value.

4. (Original) The sensor of Claim 1, further comprising a base that supports the electrodes such that an exposed surface of each electrode is exposed at a surface of the base.

5. (Original) The sensor of Claim 4, wherein the base and electrodes are fabricated as an integrated circuit.

6. (Original) The sensor of Claim 4, wherein the electrodes are lengths of metal extending vertically through the base.

7. (Original) The sensor of Claim 4, wherein the electrodes extend from one surface of the base and have a thickened cross sectional area above the top surface of the base.

8. (Original) The sensor of Claim 4, wherein the base is made from an electrically non conductive material.

9. (Original) The sensor of Claim 4, wherein the base is made from a conductive material and each electrode has an outer coating that electrically insulates the electrode from the base.

10. (Currently Amended) The sensor of Claim 1, further comprising a second at least one additional array of electrodes interleaved within the electrodes.

11. (Original) The sensor of Claim 10, wherein the second array of electrodes is made from a material different from the material from which the electrodes are made.

12. (Original) The sensor of Claim 10, wherein the electrodes of the second array are made from noble metals.

13. (Original) The sensor of Claim 10, wherein the electrodes of the second array are made from a pH responding material.

14. (Cancelled).